Using student-centered activities to promote a better understanding of how evolution applies to human health
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Introduction
Recently, the biology department has embarked upon an initiative to include Evolution Across the Curriculum through student-centered learning modules in all of our core courses. A large number of biology majors and non-majors enroll in the two course anatomy and physiology sequence; therefore, providing an opportunity to educate students about the role of evolutionary processes in shaping human health and disease. Modules were developed for this series course to give students an appreciation for how an understanding of evolution is key for advancing the field of medicine. Here we present a set of student-centered activities developed to address key gaps in student understanding of evolutionary processes and how they pertain to human health and disease. We will be focusing on those modules developed for the first course in the series, Human Anatomy & Physiology I (Human A&P).

Learning Objectives
Topics deemed most appropriate for the Human A&P course were determined based upon a departmental survey that evaluated the amount and type of coverage of evolution content coverage across the core courses. Course-specific Learning Objectives for Human A&P:
1. Students should be able to explain the role natural selection plays in human evolution with specific regard to human health and disease.
2. Students should be able to acknowledge that evolutionary processes are random and do not lead to perfection.

Approach
1. Student-centered content modules and assessments for these modules were developed.
2. Modules were deployed in control & experimental sections in Fall 2012.
3. Effectiveness of assessment questions were evaluated.
   a. Individual learning gains were compared across sections.
   b. Difficulty & discrimination analyses used to evaluate the quality of assessment questions.
4. Assessment questions were modified modules & assessments deployed again in two sections of Bio 312 Spring 2013 semester.

Module & Assessment Tool Evaluation:

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Implementation:

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Pilot Findings
- Showed negative learning gains in experimental population
- It was determined assessment tool was not reliably assessing evolution concepts.
- Assessment tool was modified and study repeated

Where do we go from here?
- Continued assessment of student learning gains
- Development of a new module to reinforce the concept of evolution not leading to perfection
- We have developed smaller “mini-modules” to address different learning goals for the second of the A&P series course
- Comparison of extensive modules (described here) with shorter, less active modules to foster deeper understanding of impact of evolution on human health and disease

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